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Screening of Different Sugarcane Species (*Saccharum Officinarum* and *Saccharum spontaneum*) for Red Rot Disease Resistance

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Abstract: Among two different *Saccharum* species viz; *Saccharum officinarum* (varieties/ lines Isd 16, Isd 20, Isd 24, Isd 28, BC_4 and *Saccharum spontaneum* (line S 20) were screened against red rot (*Colleotrichum falcatum)* disease resistance by artificial inoculation following standard plug method. The varieties /lines were graded as various levels of susceptibility and resistance using a standard disease index. Among the varieties/ lines tested Isd 20 and BC_4 have shown completely resistant, variety Isd 24, S20 have shown moderately, Isd 16 susceptible and Isd 28 highly susceptible. These varieties/ lines (Isd 20 and BC_4) may be utilized as one of the sources of resistance on the breeding programme of sugarcane to red rot disease.

Key words: Sugarcane, red rot, *Saccharum officinarum*, *Saccharum spontaneum*, disease resistance

Introduction

Sugarcane is one of the most important industrial cash crops in Bangladesh. Among many cause diseases play an important role to decrease the yield of sugarcane as well as sugar. So far 39 sugarcane diseases have been recorded in Bangladesh of which red rot (*Colleotrichum falcatum)* is considered as major one (Rahman *et al.*, 1993). Red rot of sugarcane is mainly seed piece transmissible and largely a systemic disease which has not been controlled through fungicides (Lewin *et al.*, 1976). The increasing vulnerability of the cultivated sugarcane to red rot pathogens has made it essential to incorporate the new sources of resistance in to the sugarcane breeding. The wild species *S. spontaneum* L. has been sought as genetic source of resistance to several diseases like sereh, pythium root rot, gumming, red rot and mosaic (Abott, 1938). Chona (1954) observed that spontaneum proved to be higher resistant to red rot while the nobles canes were susceptible. The present work was taken to determine the resistance sources among different high yielding varieties and wild species of sugarcane.

Materials and Methods

The experiment was conducted at the Bangladesh Sugarcane Research Institute (BSRI) farm, at BSRI, Ishurdi, Bangladesh during 2000-2002 for two seasons. Among six varieties/ lines viz Isd 16, Isd 20, Isd 24, Isd 28, BC_4 and S 20 were tested against red rot by the standard plug method (Chona, 1954). Twenty stalks of eight months old cane of each variety were inoculated with a suspension containing a single cultures of *C. falcatum* isolates collected from naturally infected

sugarcane varieties at BSRI. Two months after inoculation, canes were split open longitudinally and lesion width, occurrence and number of white patches, number of nodes transgressed and conditions of tops were scored. The red rot reaction was measured based on 0-9 scale (Srinivasan and Bhatt, 1961).

Results and Discussions

The data on the incidence of red rot on the various varieties/lines of *S. officinarum* and *S.spontaneum* to red rot pathogen are given in Table 1. During the period of 2000 to 2002, out of the six different varieties/ lines Isd 20, Isd 24, BC_4 showed resistant to moderately resistant. Among another two varieties Isd 16 and Isd 28 showed susceptible reaction to *C.falcatum*. *S. spontaneum* line S 20 found moderately resistant. Rahman (2001) also reported that the BC_4 and Isd 20 were found moderately resistant and Isd 24, Isd 28 were highly susceptible and Isd 16 was susceptible during 1999-2001. Abott (1938) reported that found *S. spontaneum* moderately resistant against red rot. Srinivasan (1956) also reported that different variants of *S. spontaneum* differ in their resistance to any given disease. In this trial for identifying the diverse sources of red rot disease resistance among different species of sugarcane the light type single isolate culture of red rot pathogen and plug method were used. Singh (1956), Sharma and Achutarama (1977), Rahman (1996) reported that light type of isolates are generally most virulent then other types of red rot pathogen. For successful exploitation of sugarcane genetic resources it is very necessary to careful characterization and evaluation of different varieties/ lines among different species. Roach (1977) also reported that selection of the *S. spontaneum* parent where the aim of hybridization is to transfer a single specific character e.g. disease resistance from *S. spontaneum* would appear obviously appropriate. The break down of red rot resistance is primarily attributed due to the appearance of new strains/ pathotypes in the red rot pathogen. Various other workers have also reported variability in red rot pathogen (Chona and Padwick,

Table 1: Resistance ratings of different sugarcane varieties / lines (*Saccharum officinarum* and *Saccharum spontaneum*) to light type isolate of *C. falcatum*

Year of screening	Variety/line	No. of plant tested	Disease reaction
2000-2001	Isd 16	20	S
	Isd 20	20	R
	Isd 24	20	MR
	Isd 28	20	HS
	BC_4	20	R
	S 20	20	MR
2001-2002	Isd 16	20	S
	Isd 20	20	R
	Isd 24	20	MR
	Isd 28	20	HS
	BC_4	20	R
	S 20	20	MR

R= Resistant (0.0-2.0); MR= Moderately resistant (2.1-4.0); S= Susceptible (6.1-8.0); HS= Highly susceptible (above 8.0)

1942; Rafay, 1950; Rafay and Singh, 1957). Different environmental factors (temperature, rainfall, soil moisture) are also responsible for infection of red rot pathogen. In spite of the various methods the introduction of resistant varieties is the best approach. It is confirmed from the present study that different levels of resistance of red rot are available in the different species of sugarcane varieties/lines and Isd 20, BC_4 and S 20 may be much more useful than others as donors in breeding program aimed at red rot disease resistance.

References

Abott, E.V., 1938. Red rot of Sugarcane. US Dep. Agric. Tech. Bull., 641: 96.

Chona, B.L., 1954. Studies on the diseases of Sugarcane in India iv, relative resistance of Sugarcane varieties to red rot. Indian. J. Agric. Sci., 20: 363-385.

Chona, B.L and G.W. Padwick, 1942. More light on the red rot epidemic. Indian Farming, 3: 70-73.

Lewin, H., S. Natarajan and S.D. Rajan, 1976. Control of Sugarcane red rot (***Physalospora tucumanesis*** Speg) by chemotherapy. Sugarcane Pathol. News L., 17: 17-20.

Rafay, S.A., 1950. Another strain of ***P. tucumanensis***. Curr. Sci., 19: 385-386.

Rafay, S.A. and V.B. Singh, 1957. A new strain of ***Glomerella tucumanesis***. Curr. Sci., 26: 19-20.

Roach, B.T., 1977. Utilization of ***S.spontaneum*** in Sugarcane breeding. Proc. 16th Cong. ISSCT, pp: 43-58.

Rahman, S., 1996. Studies on the red rot of sugarcane in Bangladesh. In. Ph.D thesis. Rajshahi University, Bangladesh, pp: 146.

Rahman, S., 2001. Screening Sugarcane germplasms for resistance to red rot, wilt and red rot wilt complex. In. Final report on BARC contract research project, BSRI, Ishurdi, Pabna, pp: 11-21.

Rahman, S., M. Iqbal and M.I. Talukder, 1993. Akher roug balai o protikar (in Bangla). BARC, Dhaka, Bangladesh, pp: 8.

Sharma, M.N. and M. Achutarama Rao, 1977. Studies on the comparative virulence of samples of red rot fungus (light race) collected from CO 419 and CO 997. Proc. Indian Sugar Technol. Assoc., 6: 97-101.

Srinivasan, K.V. and N.R. Bhat, 1961. Red rot of Sugarcane criteria for grading resistance. J. Indian. Bot. Sci., 11: 566-577.

Srinivasan, K.V. and V.V. Chenulu, 1956. A preliminary study of the reaction of ***Saccharum spontaneum*** variants to red rot, smut, rust and mosaic. Proc. 9th Cong. ISSCT., 1: 1097-1107.

Singh, H.S. Singh and N. Singh, 1956. Varietal reaction to red rot disease of sugarcane in the Punjub. Proc. 9th Cong. ISSCT., 1: 1071-1078.